

AMENDMENTS TO THE CLAIMS

Please amend claims as set forth below.

1. (Currently amended) A circulation type liquid helium recondensation device with a contaminant-purging function ~~designed to comprising: a pump which pumps~~ helium gas evaporating from a liquid helium storage tank ~~using a circulating pump, to a refiner connected to the liquid helium storage tank through a first passage, which refine-refines~~ the pumped helium gas ~~in refiners;~~ a condensing pot connected to the refiner through a second passage, ~~to which-liquefy liquefies~~ the gas; and ~~to a third passage though which-return~~ the liquefied helium ~~is returned~~ to the liquid helium storage tank ~~for recycling;~~ and a discharge circuit connected to the first passage between the refiner and the liquid helium storage tank, wherein the pump is connected to the discharge circuit ~~though a normally closed valve in which said refiners, wherein a heater -are is~~ provided ~~with heaters in the refiner, and also a discharge circuit on the inflow side, and wherein in a~~ contaminant discharge operation, the normally closed valve is opened and contaminants that vaporize ~~when by heating the refiners are refiner heated by said heaters the heater~~ are pumped by the pump and discharged to the atmosphere via said discharge circuit.

2. (Original) A circulation type liquid helium recondensation device with a contaminant-purging function as claimed in Claim 1 in which a dedicated purge pump is installed in said discharge circuit to pump and discharge vaporized contaminants to the atmosphere.

3. (Original) A circulation type liquid helium recondensation device with a contaminant-purging function as claimed in Claim 2 in which mass flow controllers are installed on the inflow side of said refiners to control the flow rate of the incoming helium gas.

4. (Currently amended) A circulation type liquid helium recondensation device with a contaminant-purging function as claimed in Claim 2 in which two or more valves are installed on the inflow side of ~~said refiners~~ the refiner to control the flow rate of the incoming helium gas by

combining said valves.

5. (Original) A circulation type liquid helium recondensation device with a contaminant-purging function as claimed in Claim 1 in which said discharge circuit is a circuit connecting the inflow side circuit of the refiner and the inflow valve of said circulating pump, and an electromagnetic valve for discharge is installed in said discharge circuit, and another electromagnetic valve for atmospheric discharge is installed on the downstream side of said circulating pump.

6. (Currently amended) A circulation type liquid helium recondensation device with a contaminant-purging function as claimed in any of Claims 1 through 5 in which the condensing ~~pots~~ are ~~pot~~ is installed to store the refined helium from the refiner as gas or liquid at near-4K temperature, and said condensing pots are provided with heaters.

7. (Currently amended) A circulation type liquid helium recondensation device with a contaminant-purging function as claimed in any of Claims 1 through 5 in which said liquid helium storage tank ~~(dewar)~~ is provided with an electromagnetic valve to regulate the pressure of the liquid helium storage tank.

8. (Currently amended) A contaminant-purging method for the circulation type liquid helium recondensation device that is employed in ~~the~~ liquid helium recondensation procedure comprising ~~the operating~~ steps of pumping helium gas evaporating from a liquid helium storage tank using a circulating pump, refining the pumped helium gas in a refiner, liquefying the gas in a cooler, and returning the liquefied helium to the liquid helium storage tank for recycling, in which said refiner is heated to vaporize contaminants deposited on the refiner, and discharging the vaporized contaminants ~~are discharged~~ from an inflow side of the refiner to the atmosphere.

9. (Currently amended) A contaminant-purging method for the circulation type liquid helium recondensation device that is employed in ~~the~~ a liquid helium recondensation procedure

comprising ~~the operating~~ steps of pumping helium gas evaporating from a liquid helium storage tank using a circulating pump, refining the pumped helium gas in a refiner, liquefying the gas in a cooler, storing the liquefied helium in a condensing pot, and transferring the liquid helium from said condensing pot to the liquid helium storage tank for recycling, in which at least either of said condensing pot or said refiner is heated to vaporize the contaminants deposited on the refiner, and the vaporized contaminants are discharged from an inflow side of the refiner to the atmosphere.

10. (Original) A contaminant-purging method for the circulation type liquid helium recondensation device as claimed in Claim 8 or 9 in which said vaporized contaminants are pumped by a dedicated pump and discharged to the atmosphere.

11. (Original) A contaminant-purging method for the circulation type liquid helium recondensation device as claimed in Claim 8 or 9 in which said vaporized contaminants are pumped by the circulating pump and discharged to the atmosphere.

12. (Previously presented) A contaminant-purging method for the circulation type liquid helium recondensation device as claimed in Claim 9 in which heating of said condensing pot or the refiner starts when the pressure in the refiner rises to a preset level and stops when the pressure falls to a preset level.

13. (Previously presented) A contaminant-purging method for the circulation type liquid helium recondensation device as claimed in Claim 9 in which heating of said condensing pot or the refiner starts when the flow velocity in the refiner falls to a preset level and stops when the flow velocity rises to a preset level.

14. (Previously presented) A contaminant-purging method for the circulation type liquid helium recondensation device as claimed in Claim 9 in which heating and cooling of said condensing pot or the refiner is performed in the operating mode sequence of heating/back-flow,

cooling, circulation recovery, and liquid level recovery.

15. (Currently amended) A refiner for ~~the~~ a circulation type liquid helium recondensation device with a contaminant-purging function designed to pump helium gas evaporating from a liquid helium storage tank using a circulating pump, refine the pumped helium gas in the refiner, liquefy the gas in a condensing pot, and return the liquefied helium to the liquid helium storage tank for recycling, in which said refiner is made up of a thermally conductive housing, with contaminant solidification unit installed on the housing, an infeed means to transfer helium gas to said housing, and a heating means to vaporize the contaminants attached to said solidification unit, and in which the contaminants ~~vaporizing~~ vaporized in the refiner by said heating means are discharged from an inflow side of the refiner to the atmosphere via said infeed means.

16. (Original) A refiner for the circulation type liquid helium recondensation device with a contaminant-purging function as claimed in Claim 15 in which said contaminant solidification unit is a staggered zigzag passage made up of thermally conductive fins.

17. (Original) A refiner for the circulation type liquid helium recondensation device with a contaminant-purging function as claimed in Claim 15 or 16 in which said infeed means is supported on the housing via a component that reduces the thermal gradient.

18. (Original) A helium gas refiner as claimed in Claim 17 in which said component to reduce the thermal gradient is a stainless steel bellows component.

19. (Canceled)

20. (Canceled)

21. (Currently amended) A circulation type liquid helium recondensation device with a contaminant-purging function as claimed in Claim 6 in which said liquid helium storage tank

(dewar) is provided with an electromagnetic valve to regulate the pressure of the liquid helium storage tank.

22. (Previously presented) A contaminant-purging method for the circulation type liquid helium recondensation device as claimed in Claim 10 in which heating of said condensing pot or the refiner starts when the pressure in the refiner rises to a preset level and stops when the pressure falls to a preset level.

23. (Previously presented) A contaminant-purging method for the circulation type liquid helium recondensation device as claimed in Claim 11 in which heating of said condensing pot or the refiner starts when the pressure in the refiner rises to a preset level and stops when the pressure falls to a preset level.

24. (Previously presented) A contaminant-purging method for the circulation type liquid helium recondensation device as claimed in Claim 10 in which heating of said condensing pot or the refiner starts when the flow velocity in the refiner falls to a preset level and stops when the flow velocity rises to a preset level.

25. (Previously presented) A contaminant-purging method for the circulation type liquid helium recondensation device as claimed in Claim 11 in which heating of said condensing pot or the refiner starts when the flow velocity in the refiner falls to a preset level and stops when the flow velocity rises to a preset level.

26. (Previously presented) A contaminant-purging method for the circulation type liquid helium recondensation device as claimed in Claim 10 in which heating and cooling of said condensing pot or the refiner is performed in the operating mode sequence of heating/back-flow, cooling, circulation recovery, and liquid level recovery.

27. (Previously presented) A contaminant-purging method for the circulation type liquid helium recondensation device as claimed in Claim 11 in which heating and cooling of said condensing pot or the refiner is performed in the operating mode sequence of heating/back-flow, cooling, circulation recovery, and liquid level recovery.

28. (Previously presented) A contaminant-purging method for the circulation type liquid helium recondensation device as claimed in Claim 12 in which heating and cooling of said condensing pot or the refiner is performed in the operating mode sequence of heating/back-flow, cooling, circulation recovery, and liquid level recovery.

29. (Previously presented) A contaminant-purging method for the circulation type liquid helium recondensation device as claimed in Claim 13 in which heating and cooling of said condensing pot or the refiner is performed in the operating mode sequence of heating/back-flow, cooling, circulation recovery, and liquid level recovery.

30. (New) A circulation type liquid helium recondensation device with a contaminant-purging function designed to pump helium gas evaporating from a liquid helium storage tank using a circulating pump, to refine the pumped helium gas in refiners, to liquefy the gas in a condensing pot, and to return the liquefied helium to the liquid helium storage tank for recycling, in which said refiners are provided with a first heater and also a discharge circuit on the inflow side, said condensing pot is provided with a second heater, and contaminants that vaporize when the refiners and said condensing pot are heated by said first and second heaters are pumped and discharged to the atmosphere via said discharge circuit.

31. (New) The circulation type liquid helium recondensation device with a contaminant-purging function as claimed in Claim 1, wherein the refiner and the cooler are provided in a single cold box.

32. (New) The contaminant-purging method for the circulation type liquid helium recondensation device as claimed in Claim 8, wherein the refiner and the cooler are provided in a cool box.

33. (New) The contaminant-purging method for the circulation type liquid helium recondensation device as claimed in Claim 9, wherein the refiner and the cooler are provided in a cool box.

33. (New) The contaminant-purging method for the circulation type liquid helium recondensation device as claimed in Claim 9, wherein the refiner and the cooler are provided in a cool box.

33. (New) The contaminant-purging method for the circulation type liquid helium recondensation device as claimed in Claim 9, wherein the refiner and the cooler are provided in a cool box.

34. (New) The contaminant-purging method for the circulation type liquid helium recondensation device as claimed in Claim 15, wherein the refiner and the condensing pot are provided in a single cool box.

35. (New) The circulation type liquid helium recondensation device with a contaminant-purging function as claimed in Claim 1, wherein a flow control valve is provided in an inflow side of the refiner and between the discharge circuit and liquid helium storage tank.